FY-2002-03 PROPOSED SCOPE OF WORK Project No.: 118
Elkhead Reservoir Escapement

Lead Agency: Colorado Division of Wildlife

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Date: 25 October, 2001 (revised 10/26/01 by Pat Nelson)

Category:
__ Ongoing project
__ Ongoing-revised project
_X_ Requested new project
__ Unsolicited proposal

Expected Funding Source:
_X_ Annual funds
___ Capital funds
___ Other (explain)

I. Title of Proposal: Investigation of nonnative fish escapement from Elkhead Reservoir.

II. Relationship to RIPRAP:

General Recovery Program Support Action Plan
- III.A.2.c. Evaluate the effectiveness and develop an integrated, viable, active nonnative fish control program

Green River Action Plan: Yampa and Little Snake rivers
- III.A. Develop basin-wide aquatic management plan to reduce Nonnative fish impacts while providing sportfishing opportunities.
- III.A.1. Implement Yampa Basin aquatic wildlife management plan.
- III.A.1.b. Control northern pike.
- III.A.1.b(1) Remove and translocate northern pike and other Sportfishes from Yampa River.
- III.B.2. Evaluate control and implement measures to control nonnative fish escapement from existing Elkhead Reservoir.

III. Study Background/Rationale and Hypotheses

Potential escapement of non-native fish from Elkhead Reservoir has been identified as an impact to listed fish in the Yampa River. Fish escapement from the reservoir was included in the 2001 work plan for Elkhead Reservoir enlargement studies conducted by Miller Ecological Consultants, Inc. Miller and Laiho (1997) recommended study of escapement prior to the selecting an escapement control device. The potential cost of building and installing a flexible, Kevlar-like net, suspended in the water column to minimize fish escapement from Elkhead Reservoir is estimated near $1 million. It is presumed that annual operating and maintenance of this screen will also be significant. These potential costs compel an evaluation of fish escapement as a pre-requisite task to justify this investment in both the recovery of the endangered Colorado river fishes and the reservoir sport fishery.

Miller Ecological Consultants, Inc. collected aquatic resource information in fall of 1995 on Elkhead Creek for fish and macroinvertebrates (Miller and Rees 1996). Two sites were studied, one downstream of the reservoir and one upstream of the reservoir. This data provides baseline information for the stream aquatic resources downstream of Elkhead and also in the upstream area but should be updated since it has been over 5 years since the last sampling. Results of this survey demonstrated the presence of small numbers black crappie and bluegill, and relatively abundant smallmouth bass in the creek in the site nearest to the dam outlet. Most bass were 30-95 mm in length with only four of 192 fish exceeding 100mm.

Colorado Division of Wildlife collected data on the reservoir fishery in 1999. They sampled with electrofishing and gill nets. The results of that electrofishing and gill netting showed that approximately 80% of the fish captured were nonnative game species. Nonnative white sucker made up the largest segment at 15% and the remainder was comprised of small percentages of individual game fish, including approximately 1% northern pike and 1% channel catfish. No native fish were collected in the reservoir.

Miller Ecological Consultants conducted a preliminary escapement study during the summer and fall of 2001 but due to the short runoff period, data was not collected during runoff. It is hypothesized that the potential for escapement is greatest during the runoff from May through June. This study proposes a means to monitor escapement during that period in the 2002-2003 runoff periods.

Elkhead Reservoir represents the largest reservoir in the Yampa Valley with potential and opportunities for warmwater fishing recreation. Due to its size, it offers considerable capacity to serve as a receiving water for nonnative gamefish species targeted for control and removal from the Yampa River. Removal of adult gamefish from the river to the reservoir serves a net benefit of both reducing their impacts on native riverine fish populations and the federally endangered fish species and providing a quality angling potential in the reservoir sport fishery. In addition to stocked warmwater fish species, potential

escapement of these "relocated" fish from the reservoir can also be investigated in this investigation.

IV. Study Goals, Objectives, End Product:

Goal: Document magnitude and characteristics of escapement of nonnative fishes from Elkhead Reservoir to guide design and operational criteria for potential screening, refine sport fishery management, and evaluate translocation of nonnative fish from Yampa River removal actions.

Objectives

1. Quantify escapement of fishes from Elkhead Reservoir by species and size during spring runoff.
2. Recommend the design and operational criteria for screening reservoir outflows that would be most effective for minimizing escapement.
3. Evaluate escapement rates of nonnative gamefish relocated from the Yampa River to the reservoir.

End Product: Annual and final reports with recommendations for future actions for screening, sport fishery management, and translocation of gamefish

V. Study area: Elkhead Reservoir, Elkhead Creek , and the Yampa River from Hayden, Colorado to the Green River confluence.

VI. Study Methods/Approach

This study will rely solely on nets placed in the spillway and on the reservoir outlet during the spring runoff to determine escapement. The nets used in the work are tailrace nets normally designed for hydro-electric projects. The nets consist of a face frame (3 ft. x 3 ft.) and an inner and outer net similar to a Fyke net in design. The net mesh will be ¼ in with a 60 foot long bag. A live car is attached to the cod end of the net.

To determine escapement, sampling downstream of the reservoir in the spillway chute and at the outlet will be conducted in each of four weeks within a six-week period from mid-April through May. Nets will be deployed to facilitate capture of fish as they move downstream from the reservoir. One net will totally cover the outlet and one net will be set in the spillway chute adjacent to the right retaining wall. Each net will be anchored with a metal frame and ropes to the spillway chute retaining wall. The net will be left in place and checked for fish every six to 12 hours. The nets will be in place for three days during each monitoring period. All fish captured will be weighed and measured. Some mortality will be expected during netting. All live fish will be marked (fin clip for small fish and individual floy tag for large fish) and returned to the reservoir.

Sampling crews will notify the CDOW at the end of each sample week with the number of Yampa River translocated fish captured in the escapement study.

Expected Results

1. Knowledge of nonnative fish escapement dynamics during spring runoff with respect to species, fish sizes, numbers, temporal patterns.
2. Data to guide design and operational criteria for screening or dam enlargement to be most effective in minimizing escapement.
3. Data to evaluate revisions to sport fishery management plans in the existing or an enlarged reservoir.
4. Data to evaluate the feasibility of relocating smallmouth bass, channel catfish, and northern pike to the reservoir from Yampa River removal efforts.

VII. Task Description and Schedule

1. Sample fish for 3 days weekly for 4 weeks within a 6 week period in Elkhead Reservoir spillway chute in April and May using tailrace nets to determine escapement.
2. Data analysis and summary report. (June-August, 2002)

VIII. FY-2002 Work

Deliverables/Due Dates by Task:

1. Data collection on fish escapement during spring runoff period – May 31.
2. Data analyses and summary report – September 3, 2001 to coordinator.

Budget Estimate

Task 1:

Labor (63 staff days)	$27,320
Travel	4,780
Equipment and Supplies	7,400
Subtotal	$39,500

Task 2:

Labor (11 staff days)	$6,795
Subtotal	$6,795

FY-2002 Total $46,295

FY-2003 Work:

Note: Implementation of out-year work depends on annual assessment of project based on results in annual report

Deliverables/Due Dates: See above.

Budget Estimate

Task 1:

Labor (63 staff days)	$30,052
Travel	5,258
Equipment and Supplies	8,140
Subtotal	$43,450

Task 2:

Labor	$7,475
Subtotal	$7,475

FY-2003 Total $50,925

IX. Budget Summary

FY-2002 $ 46,295
FY-2003 $ 50,925

X. Reviewers: Pat Nelson and Biology Committee

XI. References

Miller, W.J. and D. Laiho. 1997. Feasibility Evaluation of Non-native fish control structures. Final Report Upper Colorado River Basin Recovery Implementation Program. Prepared for Colorado River Water Conservation District, Glenwood Springs, Colorado.

Miller, W. J., and D. E. Rees. 1996. Survey of fish, benthic macroinvertebrates, and habitat in Elkhead Creek near Craig, Colorado. Final report. Prepared for Ayres Associates, Fort Collins, Colorado.